

## Human Palaeontology and Prehistory

# The first human settlement of Mediterranean Europe

Eudald Carbonell <sup>a,\*</sup>, Xosé Pedro Rodríguez <sup>b</sup>

<sup>a</sup> Institut de Paleoecologia Humana i Evolució Social (IPHES), Àrea de Prehistòria,  
Universitat Rovira i Virgili, Pl. Imperial Tarraco, 1, 43005 Tarragona, Spain

<sup>b</sup> Àrea de Prehistòria, Universitat Rovira i Virgili, Pl. Imperial Tarraco, 1, 43005 Tarragona, Spain

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### Abstract

In this paper, we discuss about when the first occupation of Europe took place. According to the present-day data, the South of Europe was occupied before the northern latitudes. The first evidences have an age of around 1.3–1.4 Ma. The lithic technology utilized by these humans is simple, and can be classified as Mode 1. This technology does not have handaxes, cleavers, and neither complex strategies of production. Probably the access to Europe during the Lower Pleistocene was accomplished through the Near East. An access through Gibraltar or Sicily is unlikely. **To cite this article:** E. Carbonell, X.P. Rodríguez, C. R. Palevol 5 (2006). © 2006 Académie des sciences. Published by Elsevier SAS. All rights reserved.

### Résumé

Cet article discute la date du premier peuplement de l'Europe. Selon les données actuelles, le Sud de l'Europe a été occupé avant les latitudes nord. Les premiers indices d'occupation humaine datent d'environ 1,3 à 1,4 Ma. La technologie lithique utilisée par ces hommes est simple et peut être classée au sein du mode 1 ; elle ne comporte pas de haches, d'outils tranchants ou de stratégies complexes de production. Au Pléistocène inférieur, l'accès à l'Europe s'est probablement effectué via le Proche-Orient. Un accès par Gibraltar ou la Sicile est improbable. **Pour citer cet article :** E. Carbonell, X.P. Rodríguez, C. R. Palevol 5 (2006). © 2006 Académie des sciences. Published by Elsevier SAS. All rights reserved.

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## 1. Introduction

The first settlement of Europe has been one of the more debated topics during the last decades. At the beginning of the 1990s, two models for the initial colonization of Europe were proposed. The advocates of a short chronology thought that the settlement of Europe occurred less than 500 000 years ago [21,41–43]. The alternative model defended a settlement prior to 0.5

million years (Ma) ago. In this second group, it would be necessary to distinguish between the defenders of a settlement of about 1 Ma ago (the 'Mature Europe', according to [12]), and the ones that postulate a much more ancient settlement, previous to 1.5 Ma ('Old Europe').

In some aspects, the long chronology was criticized accurately by the defenders of the short chronology. In this way, in the decade of the 1980s and the beginnings of 1990s, the dominant paradigm defended the fact that the human settlement of Europe started around 500 000 years ago [40]. At that time, the proofs that could neutralize this affirmation were scarce. Only the French

\* Corresponding author.

E-mail addresses: eudald.carbonell@urv.net (E. Carbonell), josepedro.rodriguez@urv.net (X.P. Rodríguez).

sites of Soleilhac and Le Vallonet could contribute with arguments against the short chronology of the initial occupation of Europe [7,8,25]. However, some authors expressed doubts about the association between the faunal remains and the lithic industry of Le Vallonet. There is no question about the anthropic origin of the quartz objects from Soleilhac, but some researchers have doubts about their ascription to the Jaramillo event. Nevertheless, from that time, new archaeological findings have been accomplished, overturning the ancient paradigm. In 1983, the discovery of Monte Poggiolo (Italy) offered arguments to the researchers who were thinking that humans lived in Europe since the end of the Lower Pleistocene [1,36] (Fig. 1). However, these proofs were not yet sufficiently solid to evade the criticisms of the defenders of the short chronology.

In the mid-1990s, a series of publications and of archaeological discoveries had influenced this discussion. In May 1994, the human fossils and lithic industry of Boxgrove were published as the most ancient proofs of human settlement in Europe, around 500 ka ago [21, 38]. However, at this time important discoveries had been accomplished, that were going to undermine the bases of the recently proposed paradigm of the short chronology. In July 1994, human fossils, lithic industry and fauna were discovered in the level TD6 of the Gran Dolina site (Atapuerca, Spain) [11]. The palaeomagnetic and biostratigraphic research indicates an age of more than 780 ka [34]. In this way, the arguments of the defenders of the short chronology were refuted. The discoveries that were accomplished parallel at Guadix Baza's Basin (Granada, Spain) reinforced this point of view [28,47]. Besides, in March 1994, a human skull was discovered in Ceprano (Italy), with a chronology of more than 780 ka [3]. As a result, the view of an initial settlement of Europe around 1 Ma ago took force. In the meantime, the defenders of the short chronology must vary their point of view, accepting the possibility of a settlement in Europe at the end of the Lower Pleistocene, although this settlement would have been limited to the South of the continent [18,44].

## 2. Lower Pleistocene evidences in the Mediterranean Europe

### 2.1. The Atapuerca evidence (Burgos, Spain)

In the Sierra de Atapuerca (near the city of Burgos, Spain), there are two sites with Lower Pleistocene archaeological record: Sima del Elefante and Gran Dolina (Fig. 1).

Some flint objects have been found in the lower levels of the Sima del Elefante. According to the faunal studies and palaeomagnetic analysis, these artefacts have an age of around 1.1–1.3 Ma [17,35]. In Gran Dolina, at least three lithostratigraphic units have provided lithic industry and faunal remains corresponding to the Lower Pleistocene: TD4, TD5 and TD6 [10,39].

The five artefacts discovered in the TD4 Unit were knapped utilizing quartzite pebbles. A unifacial core (1GNBE, according to the Logical Analytic System, see Table 1) with scarce extractions stands out [9]. Another unifacial pebble (probably also for producing flakes), which only shows three removals, appeared close to this object. Other pieces located in TD4 are a quartzite pebble with two fractures, and two positive bases (a small flake and a flake with cortical butt). The numerous faunal remains appeared close to this lithic industry (recovered in a surface of 7 m<sup>2</sup>). The chronology of these materials can be placed around 0.85 Ma [39].

In the Unit TD5, a quartzite core was recovered from the stratigraphic cut. Also various objects (most of all natural bases, i.e. hammer stones, see Table 1) were recovered during a biostratigraphic sounding. These artefacts date from more than 0.8 Ma ago [39].

The archaeological and palaeontological materials found in Unit TD6-2 stand out specially. The 268 artefacts recovered at this stratum were knapped utilizing flint, quartzite, sandstone, quartz and limestone. The application of the analysis of structural categories of the Logical Analytical System has allowed us to verify the preponderance of the positive bases (PB, flakes) with over the half of all the pieces, (near the 65%, if we do not consider the indeterminable pieces) [13]. It is pertinent to highlight the presence of 21 cores (negative bases of exploitation), from which 18 are on pebble or block (1GNBE) and three on flakes of large size (2GNBE). Also 24 retouched flakes (2NBGC) were recovered. The presence of 19 pebbles without removals is significant, in all probability utilized like hammerstones, for the production of lithic tools or to fracture bones. On the contrary, only an instrument configured on pebble (pebble tool or 1GNBC) was located.

We have identified five strategies for the production of positive bases: multifacial spherical, multifacial or trifacial orthogonal knapping, bifacial centripetal knapping, unifacial centripetal knapping, and finally, we have identified a bifacial strategy with bipolar opposed knapping in one of its faces, and linear or else orthogonal in the other face [13,39]. The multifacial spherical method was identified in a core of flint with spherical morphology, without organization or systematization in

Table 1  
 Compared terminology between the Logical Analytical System and the most common terms in Anglophone archaeological literature (from [13])

Logical Analytical System	Anglophone terms	L.A.S. Subdivision
Natural base (NB)	Cobbles, pebbles or blocks selected in order to flake them or use them as hammers.	<b>Nba</b> : Manuports (without percussion marks) <b>NBb</b> : Hammers (with percussion marks) <b>NBc</b> : Fragmented pebbles with or without percussion marks.
First-generation negative base (1GNB)	Cobbles, pebbles or blocks once flaked. They show the scars of the flakes detached from their surfaces. They can be both tools and cores.	<b>1GNBE</b> (production): cores <b>1GNBC</b> (configuration): tools on pebble / block
First-generation positive base (1GPB)	Flakes detached from the 1GNB.	Beside the refittings, it is very difficult to distinguish flakes from different generations. Therefore, all kind of simple flakes are usually called positive bases ( <b>PB</b> )
Second-generation negative base (2GNB)	Flaked flakes whose blanks were 1GPB. That is, flakes that have been retouched or modified. They usually are denticulates, notches, side-scrapers, etc.	<b>2GNBE</b> (production): cores on flake <b>2GNBC</b> (configuration): tools on flake
Second-generation positive base (2GPB)	Small flakes (debris) detached when retouching first-generation flakes.	Beside the refittings, it is very difficult to distinguish flakes from different generations. Therefore, all kind of simple flakes are usually called positive bases ( <b>PB</b> )
Fragments ( <b>FRAG</b> )	Angular fragments.	
Indeterminable ( <b>INDET</b> )	Unidentifiable lithic items, usually due to their poor preservation.	

the extraction of the products. Concerning the multifacial or trifacial linear knapping and/or orthogonal, we can differentiate objects of medium-small size from large-sized objects. Among the first ones, there is a trifacial core of Neogene flint and a multifacial core of quartz. Both cores have a quadrangular morphology and a volume that tends to be cubic. In addition, there are large-size 2GNBE of flint. These kinds of cores are ancient flakes of large size, removed from the Neogene flint blocks that appear in the Sierra de Atapuerca. The reduction of the volume of these large blanks was basically accomplished departing from their ancient ventral face. This face was used as a striking platform to extract products from the lateral sides of the object (sagittal and transversal faces). The sagittal surfaces were used also like a percussion platform to accomplish the removals that affect the dorsal face. The result of this reduction strategy is a core with a geometry like a rectangular parallelepiped. The bifacial centripetal knapping has been documented in cores of flint and of quartzite. The unifacial centripetal knapping evidences a systematic reduction of volume, by means of centripetal removals. Nevertheless, exploitation was abandoned at an initial stage. The bifacial strategy with bipolar opposed knapping in one of its faces, and linear or else orthogonal in the other face is a strategy not enough complex, which attempts to extract the maximum benefit from small nodules of Cretaceous flint, as well as of quartzite pebbles with a morphology not very adequate to apply more complex technical systems [39].

The amount of cortex is small in the flint flakes, and much highlighted in sandstone flakes, and most of all in

quartzite products. Also we have verified the existence of positive bases of reconfiguration of the flaked surfaces of the cores.

In general, the configuration of the TD6-2 artefacts evidences denticulate cutting edges and dihedrons (side scrapers). The configuration of denticulate cutting edges, which is more important than dihedrons, can be explained by the fact that these hominids had flakes of medium and large size, with good natural dihedral cutting edges [13]. Therefore, it was not essential to recur to the configuration of dihedral cutting edges through retouch. The procurement of trihedral cutting edges is feasible with the production of flakes with triangular morphology, but is more difficult than the procurement of dihedrons. For this reason, the configuration of trihedrons is important, many times making good use of the morphology of the positive bases (or flakes) that will be retouched [39]. In TD6-2, handaxes and cleavers have not been localized.

In TD6-2, processes of exploitation and systematic configuration of lithic artefacts were accomplished. The different phases of these processes are documented. The existence of refittings demonstrates the knapping at the site. The entire chain of production of these Operative Themes is demonstrated for the discovery of cores (1GNBE), flakes (PB), and small flakes (*debris*). Also some flakes were retouched in order to configure tools (2GNBE). The first results of the microwear analysis of lithic instruments (with SEM) suggest the utilization of flakes and retouched flakes of various raw materials (flint, quartzite, limestone) [13,45].

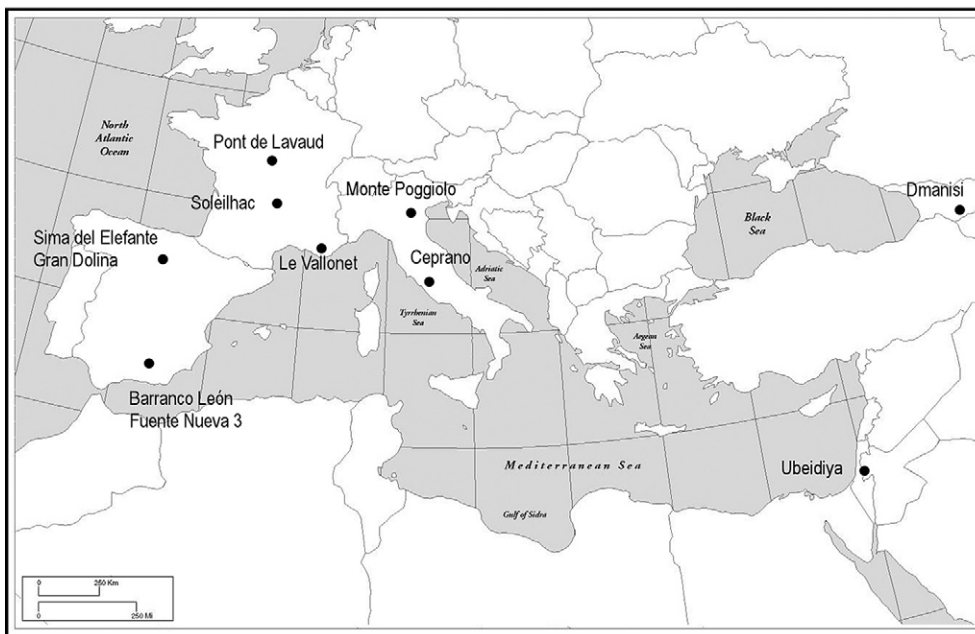


Fig. 1. Map with the situation of the Lower Pleistocene sites mentioned in the text.

Fig. 1 Carte donnant la localisation des sites du Pléistocène inférieur mentionnés dans le texte.

The absence of large instruments, well configured and intensely elaborated, linked to the characteristics of the retouch, and to the knapping methods (predominantly orthogonal), denote a not much complex technology, more related with Mode 1 than with Mode 2.

The human fossils discovered in TD6-2 have been ascribed to a new species: *Homo antecessor* [4]. More than 100 remains have been recovered to the present [6, 15].

TD6-2 was probably a ‘referential site’, that is, a space that was frequently used for several activities, some of which were carried out from the beginning to the end in the cave [5].

## 2.2. The Guadix–Baza Sites: Barranco León 5 and Fuente Nueva 3 (Granada, Spain)

In 1983, the first lithic artefacts were discovered in Barranco León 5, and at the beginning of the 1990s artefacts also appeared in Fuente Nueva 3 [23]. The archaeological works in this area have been conditioned because of the dispute on the hominid character of some fossils found in the Venta Micena’s palaeontological site [22,30,32,33]. However, one finds always a consensus in relation to the age of Barranco León 5 and Fuente Nueva 3 lithic artefacts. By means of macro and microfauna as well as palaeomagnetic analyses, the age of these two sites is dated to 1.3–1.1 Ma [31,33,46].

According to Palmqvist et al. [33], 358 objects were discovered in Barranco León 5. The majority of the artefacts were knapped with flint and limestone, collected in areas close to the site. The lithic material is composed basically by flakes (over a half of which are of small size). There are very few retouched flakes. The more habitual method of exploitation is centripetal, without preparation of the cores. The orthogonal and multidirectional strategies have also been documented. Few cores have been located at this site. The size of these cores is small, and the products are flakes with fundamentally cortical butts, a few times faceted. An abundant fauna appeared in the same level, clearly indicating a Lower Pleistocene chronology [29].

In Fuente Nueva 3, the lithic artefacts were found in surface and in stratigraphic context, most of all in the level 2. According to Oms et al. [31], the sedimentation suggests a low-energy ambient. The fauna is numerous and clearly of Lower Pleistocene age [29]. The absence of marks of teeth in the fauna, and the nearly absence of carnivores beasts would exclude the activity of predators in this accumulation. According to the data presented by Palmqvist et al. [33], 381 lithic pieces have been recovered. Small pebbles of flint are the most utilized raw material, although limestone was also knapped. Just like in Barranco León 5, the small flakes dominate the ensemble, and the retouched flakes also are not enough habitual. If we take into account all of



the recovered material, we can infer that various knapping methods were utilized. The most frequent strategy consists in short series of extractions, with relatively frequent changes of striking platform; also the centripetal knapping appears; and finally a method of exploitation that produces elongated flakes, with laminar tendency [28]. This type of exploitation would be accomplished utilizing the bipolar technique that produces flakes with two bulbs and frequent longitudinal fractures. So much in Barranco León 5 like in Fuente Nueva 3 handaxes and cleavers have not been localized.

### 2.3. Lower Pleistocene sites from Italy: Ceprano and Monte Poggiolo

Ceprano is an open-air site where a human skull was discovered in March 1994 [3,26]. Lithic industry did not appear close to the skull. However, there are other nearby localities that certainly have provided lithic record. Some of these deposits with Mode-1 lithic tools have been correlated with the human fossil of Ceprano. The age of these archaeological materials and of the human skull can be placed around 0.8–0.9 Ma ago.

In Ca'Belvedere di Monte Poggiolo, the lithic industry is contained in sands and gravels deposits that belong to the last phases of a complex coastal regressive series. The bottom of this series is composed of clayey Plio-Pleistocene sediments. The lithic industry was knapped utilizing small pebbles of flint (almost never of more than 10 cm). These pebbles were exploited utilizing a not very complex bipolar technique, predominating over the longitudinal and orthogonal strategies, clearly conditioned by the size and the morphology of the raw material [48]. There are many cortical products and not faceted butts, but few retouched flakes, represented by some side scrapers and most of all by denticulates. Numerous refitting operations have been carried out, proving that the knapping activities took place in situ. The lithic record of Monte Poggiolo has been classified as Mode 1 [37,48].

### 2.4. Lower Pleistocene sites from France: Soleilhac, Le Vallonet and Pont de Lavaud

The lithic industry recovered in Soleilhac consists of 446 objects, knapped most of all with quartz and basalt, although also flint was used, as well as granite. According to Bracco [8], the lithic industry can be divided into two groups: on the one hand, the large-sized objects, principally on pebble or small blocks of basalt and granite, and, on the other hand, the objects of small size, on flakes of flint or quartz, with a well-configured

retouch (side scrapers, notches, denticulates). Bonifay [7] thinks that there are testimonies of an intentional space organization. The problem of this site is not the anthropic origin of the lithic industry, but the fauna that would be able to fit well among the Cromerian faunas, like the faunal record of Isernia la Pineta. That is, the fauna can belong to the initial Middle Pleistocene. According to Roebroeks and van Kolfschoten [43], more chronological studies are necessary to prove that this site dates back to the Lower Pleistocene.

The cave site of Le Vallonet has lithic industry associated to a numerous and generally well-preserved fauna. The lithic raw material is almost exclusively limestone. There are pebbles with only one removal, *choppers*, *chopping tools*, side scrapers and cores among the 59 identified objects [24]. Concretely there are 13 pebbles with a unique convex removal, 8 with a concave removal, 4 *choppers*, 6 *chopping tools* and 2 side scrapers. The half of the 26 identified flakes has the dorsal face completely cortical.

Pont-de-Lavaud is an open-air site in the base of 90–100-m terrace of the Creuse River (Eguzon-Chantôme, central France, Fig. 1). The lithic record exceeds the thousand of objects, knapped utilizing quartz. The technological and typological traits allow us to ascribe these materials to Mode 1 [19]. The presence of tools configured directly on pebble, with unifacial (*choppers*) and bifacial (*chopping tools*) retouch stands out. Also polyhedrons, as well as retouched flakes, have been recovered. From the typological point of view there are denticulates, *becks*, notches, side scrapers and end scrapers. Only a fragment of flat bone has been located in direct association with the lithic industry, ascribed to a horse mandible. Also a horse tooth was located in a zone close to the excavation, at an equivalent layer. The dating by means of Paramagnetic Electronic Resonance (PER) have provided a chronology between 0.905 and 1.187 Ma ago [20].

## 3. Discussion

The situation of many of the most ancient sites of Europe seems to reflect that the first human waves settled in the Mediterranean ecosystems. These environments would be more similar to the African originals. The human occupation of the North of Europe during the Lower Pleistocene is not contrasted. These human groups put into practice a Mode 1 lithic technology. These first European industries of Mode 1 show somehow different characteristics, although all of them have elements in common: the selection of local raw materials; the small size of the pieces; and the scarce systema-

tic preparation of the cores. In general, the application of not much complex methods of knapping and configuration stand out. In spite of that, the unidirectional, multidirectional and centripetal methods are present. The discontinuous retouch, characteristic of the denticulates, dominates among the retouched pieces, and there are not large instruments on positive bases (flakes) [14]. In many instances, the selection of the raw material and of the pebbles or blocks does not depend on a special technical requirement. The exception can be Fuente Nueva 3 (Granada, Spain), where a flint of good quality accompanies some methods of exploitation of more standardized flakes. For it, this industry has been related with an African developed Mode 1 [46,47]. On the other hand, the lithic ensemble of TD6-2 (Gran Dolina, Atapuerca, Spain) has differed features in relation to the European Mode 1, because of the presence of large flake cores. The lithic record of the European Mode 1 continues after the end of the Matuyama epoch, with sites like Isernia la Pineta (Italy), with an age of 650 ka [16].

Nevertheless, in spite of the scarce complexity of these tools, it seems evidently that these artefacts satisfied the function that they were destined for. The abundance of use wears in numerous tools proves that these artefacts were used habitually in different tasks. In studies on Gran Dolina TD6-2 [13,27] and Monte Poggiolo [48], the researchers have documented activities on wood, possibly related to clearing of the weeds or conditioning of specific areas, or perhaps led also to elaborate implements with this material. The work on materials like bone and meat also stands out, reflecting the activities of meat supplying.

It is pertinent to stand out that most of these sites of the initial Middle Pleistocene are located below or close to the parallel 40–45°, i.e. in temperate environments. All it seems to indicate that more than 500 ka ago, temperate Europe was regularly settled, while the north zone had been scarcely visited.

The majority of the researches propose that the gateway to Europe was the Near East, a natural corridor directly linked with the African Rift System, and utilized by different animal species in their migrations. This hypothesis can be supported by the great antiquity of human occupations in the Near East (Ubeidiya, Israel) and in the Caucasus (Dmanisi, Georgia).

On the contrary, some researchers propose the Strait of Gibraltar like gateway to Europe, directly from Africa [2]. This hypothesis would explain that the older sites in Europe are Fuente Nueva 3 and Barranco León 5, in the south of the Iberian Peninsula, close to Gibraltar. Nevertheless, we thought that this hypothesis is im-

probable. The gateway through the strait of Gibraltar during the Lower Pleistocene cannot be discarded definitively, but if this was the gateway to Europe, it would have had to be something more than a punctual event. We can accept that, in exceptional circumstances, some humans crossed the Strait of Gibraltar during the Lower Pleistocene, but it is unlikely for them to have done it systematically. For this reason, it is difficult to explain an initial settlement realized exclusively or fundamentally through Gibraltar. The movement of numerous human groups was easier through the Near East, although distance is larger. Otherwise, the access through Sicily would be more difficult than through Gibraltar, and moreover there are no proofs of occupations during the Lower Pleistocene in this island [49].

#### 4. Conclusion

The present-day information allows us to affirm that Mediterranean Europe was occupied by humans during the Lower Pleistocene, probably around 1.3–1.4 Ma ago. Over the late years, human fossils and lithic industry have been discovered in sites with stratigraphic context. The Gran Dolina site, stands out, with human fossils, well-dated lithic industry and faunal remains.

The first occupations of Europe evidence a not very complex lithic technology, classified as Mode 1, lacking handaxes and cleavers. The northernmost latitudes of the European continent failed to be settled until the Middle Pleistocene, circa 0.5 Ma ago. Precisely since 0.6–0.5 Ma ago, Mode 2 begins to appear in Europe. Nevertheless, during the Middle Pleistocene, there are sites without the characteristic standards of Mode-2 technology, i.e. handaxes and cleavers.

The more probable gateway to Europe during the Lower Pleistocene is the Near East. The present-day data allow us to discard an access across Gibraltar or Sicily.

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